

**REQUEST FOR ARCHITECTURAL AND ENGINEERING  
DESIGN SERVICES**

**LITTLE FALLS DAM: CONSTRUCTION OF A REPLACEMENT  
WATER CONTROL STRUCTURE (DAM)**

**WISCONSIN DEPARTMENT OF NATURAL RESOURCES**

**WILLOW RIVER STATE PARK**

**HUDSON, WI  
ST. CROIX COUNTY**

**APRIL 2016**

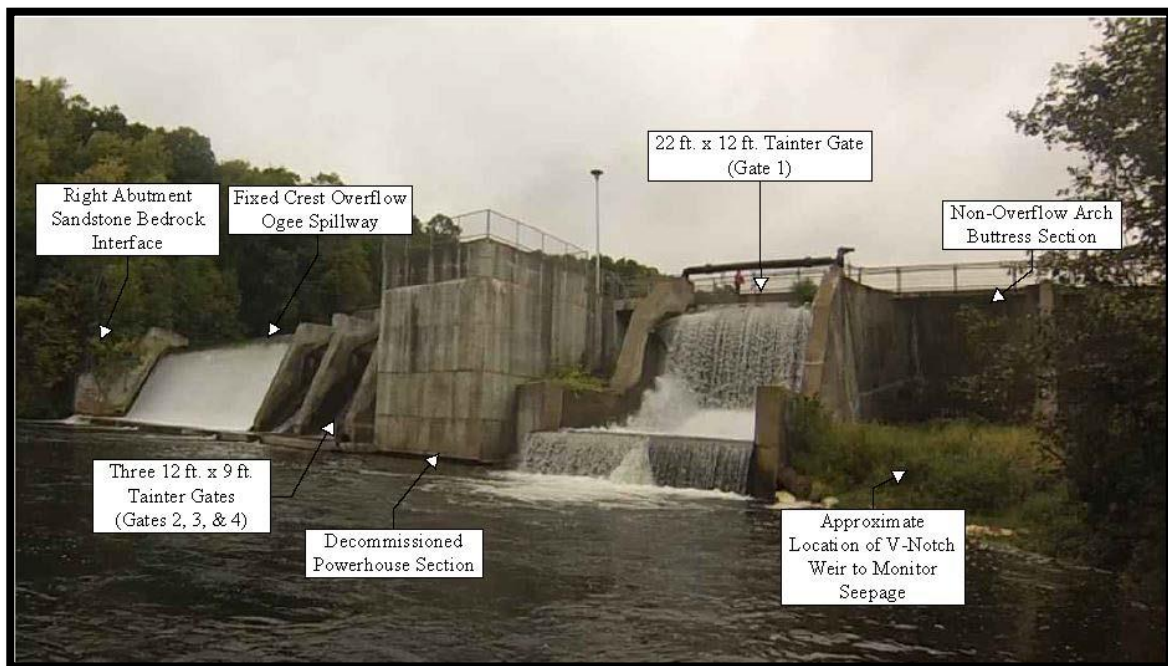
**PROJECT 16D11**

## **Project Background and Purpose**

This project will provide for the planning, design and construction of a replacement water control structure (dam) on Little Falls Lake at Willow River State Park.

Willow River State Park near Hudson, Wisconsin in St. Croix County is the site of Little Falls Lake, a 172-acre impoundment formed by the Little Falls Dam. The dam was originally built circa 1892 on a timber crib structure. With improvements in the 1920's and 1930's, the dam became what it appears today, a concrete structure with four tainter gates, a concrete overflow section and a concrete multiple arch buttress section. In recent years, inspections have identified a series of issues that call to question the structural integrity of the dam. Some of these issues include malfunctioning gates, seepage through and around the dam, and cracks in the concrete. Additionally, it was determined that the dam does not possess the capacity to pass both 100-year and 1000-year flows as required by NR 333 Wisconsin Administrative Code for a high hazard dam.

The base flow for the Willow River at the Little Falls Dam is between 100 and 200 cubic feet per second. As it existed prior to the breach completed in October 2015, looking upstream (from right to left) the dam includes a 117 ft. concrete multiple arch buttress section, a 22 ft. wide by 12 ft. tall tainter gate, 43 ft. wide powerhouse, three 12 ft. wide by 9 ft. tall tainter gates, a gated 3 ft. diameter low water draw (sluice gate), and a 72 ft. concrete overflow spillway. The Gate 1 bay and piers, arch 4 and 5, and the right buttress were all removed during the breach in October 2015.



An outside consultant, Ayres Associates, was tasked by the Wisconsin Department of Administration (DOA) – Division of Facilities Development (DFD) to complete a parallel review

of the dam's deficiencies. This included evaluating potential corrective measures with State engineers, and then providing design calculations, conceptual drawings, and general cost estimates to these options in a feasibility study (DFD Project 14E3P, *The Little Falls Dam Reconstruction Pre-Design Feasibility Study*, April 2015). This study yielded eight different possible construction alternatives that would address the compliance issues related to the public safety concern from the dam's structural deterioration and insufficient flood flow capacity. These options are variations expanding upon three basic alternatives; 1) Remove and Replace the Dam, 2) Permanently Remove the Dam—Stream Restoration, and 3) Dam Repair. Based on the 14E3P Ayres study, coupled with a surface and dive inspection (DFD project 13D2V), inspections from DNR Agency Water Program dam engineers, and DNR facilities engineers, it was determined that repair was not a viable option due to a failing dam foundation and unknown spillway condition. The DNR has made a final recommendation to move forward with removal of the existing dam and replacement of the dam.

In spring of 2015 the Department of Natural Resources (DNR) determined that, in the interest of health and safety, the lake should be drained. Since the gate structures did not have the capability to completely drain the lake in July, a wide breach—removal of a large section of the dam—was recommended and implemented. The drawdown began in early June 2015, and concluded by the middle of October 2015.

The Project Team reviewed all available information, in addition to vetting each option against set guidelines for making a decision. Those guidelines included; the future project had to be safe, code compliant, have little to no environmental impacts, provide for future water-based recreation at the property, take into consideration the majority public opinions, and be of a reasonable and achievable budget.

Removing and replacing the dam will preserve the main recreational functions of the park as they are currently known by the public today. This includes boating, fishing, swimming, as well as wildlife viewing and bird watching. A newly designed, constructed, and NR 333 Wisconsin Administrative Code compliant dam will provide the best solution possible to address the insufficient flood-flow capacity, provide for a “cold water” discharge to support a trout fishery, and permanently correct the structural instability of the existing dam. Additionally, the public support for a new structure and a restored Little Falls Lake is overwhelmingly supported by park users, neighbors, local residents, and elected officials.

### **Project Description**

This project will remove and replace the existing dam with a newly constructed dam in approximately the same location. The DNR intends to replace the existing Little Falls Dam and thus maintain the pre-breach lake water levels of Little Falls Lake along with the lake's aesthetic and recreational uses.

The newly constructed dam must meet the following goals:

1. Spillway Capacity – The dam must pass the 1000-year flow without overtopping and 100-year flow through the principle spillway and meet all applicable water control structure codes.
2. Maintain the current reservoir normal pool elevation.
3. Provide a cold water draw which will improve the trout habitat down stream
4. Dam should have little or no need for active operation.
5. Include public access to the dam structure for recreational and educational purposes. Alternatives will need to be investigated as the current structure is listed as a high hazard dam.
6. Minimal visual impact on the property landscape (minimal size and height).

In addition to the construction of a new dam, this project must also address the project access route through reconstruction of the existing entrance road to the project site as well as address any impoundment shoreline stabilization and impoundment basin restructuring to improve habitat and the fishery.

Repair, or removal and restoration of the stream channel have been determined to not be viable alternatives for this project and should not be considered as part of this project.

### **Scope of Services**

The A/E will provide pre-design through construction administration services as indicated in the DFD “*Policy and Procedure Manual for Architects/Engineers and Consultants*”, the “*Guide for Developing Program Statements for Projects Requiring Enumeration*”, and the DFD “*Contract for Professional Services*” as directed by DFD at the Design Kickoff meeting. The services may be contracted for in multiple contracts, or a multi-part contract with project-specific review/ approval/ authorization points in the contract, as determined by the needs of the project. Authorization for subsequent services will be issued in writing upon satisfactory performance and completion of contracted services and deliverables. Additionally, the A/E shall provide the following Pre-design services and deliverables:

- Prepare a preliminary (approximately 10% design effort) project cost estimate to the DNR for Capital Budgeting purposes by December 2016.
- Prepare recommendations and cost estimates for geo-technical investigations that should be undertaken prior to commencing Preliminary Design.

The existing structure has previously been evaluated and it has been determined that repairing the existing structure is not an option. Inspection reports can be found at the website listed in the Additional Documents section of this request.

In addition to the requirements of the *Policy and Procedure Manual for Architects/Engineers and Consultants* for Preliminary Design, the A/E shall provide the following Preliminary Design services and deliverables:

- The design process is expected to include input from Department of Natural Resources (DNR) staff including the Little Falls Dam project team as well as other internal natural resources subject matter experts.
- The A/E consultant team will be expected to submit plans for code review and may possibly be required to obtain conditional approval from the Army Corps of Engineers.
- Since the proposed site is within an operating State Park, the design will include specific plan for site security, construction contractor access and staging.
- The A/E consultant may be required to attend approximately 2 public informational meetings and provide conceptual design drawings and exhibits.

Refer to the DFD Invitation for Consultant Services, for AE Qualification Requirements.

Note that per the *DFD Policy and Procedure Manual for Architects/Engineers and Consultants*, the following services will not be included in the scope of services:

- The DNR determined that an EIS or EA was not required for this project. The Strategic Alternatives Analysis Plan includes all pertinent environmental impact information and should be used for this project rather than an EA or EIS.
- Independent 3<sup>rd</sup> Party Commissioning will not be required.

### **Project Schedule**

A/E Selection	August 2016
Design Report	May 2017
Bid Opening	February 2018
Construction Start	May 2018
Substantial Completion	August 2019

### **Project Budget**

Construction	\$6,724,800
Design Fees	558,200
Contingency	470,800
DFD Management	<u>287,900</u>
Total Project Budget	\$8,041,700

## **General Requirements/Considerations**

### **Special Considerations**

Project will take place at an open and active state park property. Special consideration should be taken to ensure the safety of visitors and staff.

### **Additional Documents**

Willow River State Park Alternatives Analysis and supporting documents:

<http://dnr.wi.gov/topic/parks/name/willowriver/littlefallsdam.html>